11:30 a.m.

820-3 **Accuracy and Reliability of Intracardiac Echocardiography Guided Device Closure of Atrial Septal Defects**

Michael J. Mullen, Brian F. Diaz, Fiona Walker, Samuel C. Sui, Lee Benson, Peter R. McLaughlin, *Toronto General Hospital, Toronto, Ontario, Canada, Hospital for Sick Children, Toronto, Ontario, Canada.*

Background: The recent development of intracardiac echocardiography (ICE) has added a further dimension to the imaging modalities available to cardiologists. We therefore prospectively assessed the feasibility and accuracy of ICE in assessing device closure of secundum atrial septal defects (ASD).
Methods: ICE was used as the primary echocardiographic modality for guiding device closure of secundum ASD in consecutive patients. The primary endpoint was the satisfactory position of the occluding device, after deployment but prior to its release from the delivery system. For each device septal capture was assessed in longitudinal and short axis views and judged to be satisfactory or unsatisfactory using a dichotomous variable. Sequential transesophageal echocardiographic (TEE) examinations were performed, independently, to confirm the accuracy and reliability of ICE immediately after completion of the ICE examination. Potentially adverse procedural events (PAPEs) that might impact on the success of the interventional procedure were logged.
Results: High quality ICE images were achieved in all the patients, though views were limited in 2 patients with grossly aneurysmal atrial septa. ICE was used to guide the closure of 36 ASD in 34 patients, with confirmatory TEE data available for 25 devices in 23 patients. The median ASD size was 15.4 ± 4.6 mm (range 4 to 25 mm) with a stretched diameter of 19.2 ± 5.7 (range 6 to 32). There was close agreement between ICE and TEE in assessing satisfactory septal capture (99%). A total of 9 PAPEs, including device malpositions, additional defects and anomalous pulmonary venous drainage, which required remedial action, were detected by ICE in 7 patients. No additional PAPEs were detected by TEE, however, ICE detected 2 defects not initially seen by TEE. There were no complications associated with the use of ICE.
Conclusion: We have demonstrated the accuracy and reliability of ICE in guiding device closure of ASD comparable to that of TEE. ICE detected all PAPEs, which would impact on the successful outcome of the procedure and will facilitate the closure of ASD without the need for general anesthesia.

11:45 a.m.

820-4 **Percutaneous Closure of Atrial Septal Defect Under Intracardiac Ultrasound Guidance: Comparison With Procedures Guided by Transesophageal Echocardiography**

Eulogio Garcia, Enrique Maroto, Raul Moreno, Ignacio Zabala, Oscar Diaz-Castro, Carlos Maroto, Jose L. Zunzunegui, Ruben Greco, *Hospital Gregorio Maranon, Madrid, Spain.*

Percutaneous closure of ostium secundum atrial septal defect (ASD) using the Amplatzer closing device is becoming the preferred alternative to surgical repair. Classically, size selection, deployment and correct positioning of the device is guided by transesophageal echocardiography (TEE). TEE monitoring of percutaneous procedures requires complete anaesthesia and orotracheal intubatin in small children and important sedation for adequate tolerance in bigger children and adult patients.
Trying to determine the role of intracardiac ultrasound (ICU) for guidance of percutaneous closure of ASD using the Amplatzer device, we have analised the results of 90 procedures. Out of them, 51 consecutive patients underwent the procedure guided by ICU, and the remaining 39 by TEE. ICU guidance was performed with the 9-French 9 MHz ULTRA ICE catheter hooked to a Clear View ultrasound console (Boston Scientific, EP Technologies, San Jose, CA), which was introduced through the left femoral vein and advanced through the right atrium. Procedures guided by the ICU were done in small children under sedation without the need of orotracheal intubation and with only local anaesthesia to the groin in bigger childrean and adults.
Results: Demographics and deffect characteristics were similar in both groups. The Amplatzer device could not be properly positioned in 3 patients (3.3%) (1 in patients with ICU guidance and 2 in those guided by TEE), and was retrieved without complications. Clinical and echocardiographic follow-up showed favourable outcome without late in patients of both groups. Procedural time (61 vs 85 min, p=0.01) and radiation exposure (14 vs 22 min, p=0.01) were significantly reduced in the procedures guided by ICU.
Conclusion: ICU guidance for percutaneous closure using the Amplatser device appears like a valuable alternative to TEE monitoring. Procedures performed with ICU are safe, equally effective, required less procedural and radiation exposure time, do not required orotracheal intubation in small children and were better tolerated by adolescents and adults.

Noon

820-5 **Percutaneous Closure of Patent Foramen Ovale in Patients With Paradoxical Embolism: Impact of Patent Foramen Ovale Dedicated Devices on Procedural Complications and Residual Shunt**

Markus Schwerzmann, Bernhard Meier, Andreas Wahl, Franz R. Eberli, Christian Seiler, Haresh Mehta, Marianne Zimmerli, Stephan Windecker, *Swiss Cardiovascular Center Bern, Cardiology, Bern, Switzerland.*

Background: Percutaneous treatment of atrial septal abnormalities is feasible using a variety of devices. Structural and functional differences between patent foramen ovale (PFO) and atrial septal defects have led to the development of PFO dedicated devices. The purpose of the present study was to compare the safety and efficacy between the PFO Star device (PFO-S) and Amplatzer PFO occluder (PFO-A).
Methods: Implantation characteristics and procedural complications were prospectively studied in 110 consecutive patients undergoing percutaneous PFO closure for presumed paradoxical embolism. Contrast transesophageal echocardiography was performed 6 months after device implantation to determine the presence of a residual shunt. The results were analyzed according to the type of closure device: PFO-S (n=55) or PFO-A (n=55). Predictors for procedural complications and residual shunt were calculated using a logistic regression model.
Results: There were no differences in baseline characteristics (gender, body mass index, age, left atrial size, presence of atrial septal aneurysm, degree of shunt before closure) between the 2 groups. Device implantation was successful in all patients, however, more attempts were required for placing a PFO-S than PFO-A (>1 attempt: 9% vs. 2%, p=0.05). The transseptal sheath size was significantly larger in the PFO-S compared with the PFO-A group (11.6 +/- 0.15 French vs. 8.5 +/- 0.09 French, p=0.001). There were more minor and major adverse events in the PFO-S than PFO-A group (16% vs. 2%, p=0.008). The use of a PFO-S device was a significant predictor of procedural complications (odds ratio 10, CI 2.3-81). A significant residual shunt 6 months after intervention persisted more frequently in the PFO-S than PFO-A group (27% vs. 2%, p=0.002; odds ratio 8.3, CI 1.7-39). Conclusions: Percutaneous PFO closure with the Amplatzer PFO Occluder appears safer compared with the PFO STAR device. In addition, the Amplatzer PFO Occluder proves more effective with respect to echocardiographic closure 6 months after device implantation. Long-term follow-up will be required to determine a difference in recurrent thromboembolic events.

POSTER SESSION

1120 Novel Strategies for Improving Congenital Heart Disease Surgery

Monday, March 18, 2002, Noon-2:00 p.m.
Georgia World Congress Center, Hall G
Presentation Hour: 1:00 p.m.-2:00 p.m.

1120-97 **Video-Assisted Ligation of Patent Ductus Arteriosus: Results of Multiple Ligation Technique, Need for Transesophageal Echocardiography, and Appropriateness of Same-Day Hospital Discharge**

William M. DeCampli, Kristi L. Peterson, Guillermo R. Sanchez, Richard J. Myung, Mary Berry-LeBoeuf, Carolyn Fabian, Gil Wernovsky, *The Children's Hospital of Philadelphia, Philadelphia, Pennsylvania.*

Background: Surgical management of patent ductus arteriosus (PDA) is usually performed by thoracotomy using multiple ligation (ML) or by video-assisted thoracoscopic surgery (VATS) using a single clip. Most series report a 1-3 day hospital stay. We (1) report results of VATS using ML, (2) assess the need for intraoperative transesophageal echocardiography (TEE) and (3) assess appropriateness of "same day discharge" from the hospital.
Methods: All pts referred to a single surgeon for VATS ligation of isolated PDA from 3/97-8/01 were included. Through 3-4 5mm incisions, a silk tie and 1 or 2 clips were applied to occlude the PDA. TEE was performed in all pts. Discharge occurred when the usual criteria for post-operative (post-op) recovery were met and the family consented. Follow-up was obtained by phone or mail survey, clinic visit and subsequent echocardiography. Hospital charges were obtained from the hospital's databases.
Results: 91 pts underwent VATS, median age 24 (2-192) months. Mean operative duration was 56 ± 27 (standard deviation=SD) min. TEE confirmed closure in all cases and altered the procedure in 2 cases (additional clip). 46 pts were discharged on the same day, 40 the next morning, and 5 two days post-op. Overnight stay was associated with afternoon operations or parental influence. There were no readmissions. Mean hospital charge was $15,140 ± $2,889 (SD), including the $2800 TEE fee. Early complications included conversion to thoracotomy (2 for exposure, 1 for bleeding) and pneumothorax (1). Survey follow-up was obtained in 73/91 patients. Comparing those pts discharged on the day of surgery with those dischaged later, there was no significant difference (p=ns) between the frequency of pain medication (median=1) or need for parental attendance (median=1)on the first night after discharge. 56/73 had no emesis, 59/73 ate normal breakfast and 56/66 walked without guarding the morning after discharge. Late complications included persistent hoarseness (1), and residual ductal flow (3).
Conclusion: VATS with ML is an effective method of PDA ligation, with >95% late occlusion rate. TEE altered the procedure in only 2.2% of cases. "Same day discharge" is safe and appropriate following VATS.